

streamers and light extended from east and west through the zenith. At Detroit, Mich., three arches were seen at altitudes of 45°, 65° and 90°; also a corona near the zenith, and streamers and light 10° south of zenith; the three arches were continually moving upward or southward and back again, reaching sometimes 15° south of zenith. At Adrian, Mich., two arches first appeared, then a third one at or south of zenith from E. to W.; similar phenomena was seen throughout Mich. In Connecticut streamers flashed near to the zenith. In Illinois and Indiana observers generally report no true arch, but only waves, clouds, and streamers of light. At Gardiner, Me., a beam from east to west reached the zenith. New Jersey two arches seen, the second indefinite and within the first. Central New York arches from east to west through the zenith, and two or three others lower down towards the north; a fine corona was observed at Cazenovia, North Volney, Oneida and North Argyle; at New York city the altitudes of the arches were 45°, with streamers to the zenith. In Ohio telegraph lines were affected with ground currents, and one, and sometimes two perfect arches were observed, with streamers reaching to 75° altitude. Vermont, one of the most brilliant ever seen; corona was seen at Newport. Wisconsin, corona was seen at Manitowoc, Neillsville, and Rocky Run. The electric disturbance on telegraph wires was sufficient to interrupt the ordinary business between New York, Buffalo, Baltimore, Montreal and Washington.

OPTICAL PHENOMENA.

Solar Halos.—1st, Ind., N. J., N. Y.; 2nd, Ill., Ind., Iowa, Minn., Ohio, Wis.; 3rd, Del., Md., N. J., N. M., Ohio, Penn., Va., Vt.; 4th, Ga., Iowa, Me., Neb., N. H., Ohio, S. C.; 5th, Ind., Iowa, Mass., N. J., N. Y., Ohio, R. I., Wis.; 6th, Cal., Conn., Me., Mass., N. H., N. Y.; 7th, Minn., N. J., N. M., Wy.; 8th, Conn., Iowa, Mass., Mich., Neb., N. H., Ohio, R. I.; 9th, N. Y.; 10th, Ala., Fla., Ill., Kan., Ky., Miss., N. Y.; 11th, Iowa, N. Y., Wis.; 12th, Conn., Ind., Iowa, Mass., N. Y., Ohio, R. I., Wis.; 13th, Ind., Me., N. J., Ohio, Wy.; 14th, Ala., Ind., Ky.; 15th, Ala., Dak., Ind., Iowa, La., N. Y., Ohio; 16th, Fla., Ind., Iowa, N. Y., Tenn., Wis.; 17th, Ga., Ill., Ind., Mass., N. J., N. Y., Ohio; 18th, Conn., Ill., Ind., Miss., N. Y., Ohio, S. C., Wis.; 19th, Conn., Fla., Ga., Ill., Ind., Mich., N. H., N. Y., Ohio, Wis.; 20th, Conn., Ill., N. J., R. I.; 21st, Me., N. H.; 22nd, Ill.; 23rd, Texas; 24th, Ala.; 25th, Neb.; 26th, N. H.; 28th, Conn., Ill., Me., Mich., Wis.; 29th, Neb.; 30th, Ill.; 31st, Conn., Mass., N. Y., R. I.

Lunar Halos.—2nd, Iowa, Mo.; 5th, N. Y.; 14th, Ind.; 15th, Iowa, Mich., N. J., Penn.; 16th, Ind., Ky., N. J., Ohio; 17th, Conn., Ga., Ill., Ind., Iowa, Me., Mass., N. J., N. C., Texas, Wis.; 18th, Ala., Ill., Ind., Iowa, La., Mich., Mo., N. J., N. Y., Tenn., Wis.; 19th, Del., Ind., Me., Mich., Minn., N. J., N. Y., Ohio, Penn., Texas, Utah, Va.; 20th, Miss., Mo., N. J., N. Y., Va.; 21st, Cal., Mich., Mo., Texas; 22nd, Kan., Mo., Neb., Texas, Va.; 23rd, Iowa, Mo., Texas; 24th, Ala., Mo.; 25th, Minn.; 27th, Ga., Iowa; 28th, Fla.; 29th and 30th, La.

Mirage.—Tybee Island, Ga., 1st, 8th; Duluth, Minn., 8th, 23rd, 24th; New Bedford, Mass., 25th; Barnegat, N. J., 31st.

Scintillation of Stars.—No observations of scintillation have been received for May.

MISCELLANEOUS PHENOMENA.

Zoological.—Botanical.—The blooming and ripening of fruits only have been reported: *Apple* in bloom on the 5th in Conn.; 19th, Ga.; 7th and 13th, Ill.; 7th, 13th and 17th, Iowa; 19th and 31st, Me.; 16th, 17th and 21st, Mass.; 13th, Mo.; 2nd, Neb.; 4th, N. J.; 15th, N. H.; 21st and 30th, N. Y.; 6th, 7th, 8th, 13th, 14th and 15th, Ohio; 14th and 22nd, Penn.; 19th, Vt.; 18th, Wis. *Asparagus* ripe, 1st, Mass. *Cherry* in bloom, 1st, 7th, 11th, 12th and 13th, Mass.; 4th, Conn.; 14th, 15th and 18th, N. Y.; 1st, Ohio; 8th, Penn.; 16th, Vt.; ripe, 22nd, Miss. *Currants* in bloom, 6th, Mass. *Peach* in bloom, 6th, Conn.; 3rd and 13th, Mass.; 19th, N. Y.; 2nd, 11th and 15th, Ohio; ripe, 30th, Texas. *Pear* in bloom, 4th, Ill.; 16th, Me.; 10th, 13th, 14th and 17th, Mass.; 17th, N. H.; 18th, 19th and 21st, N. Y.; 9th and 18th, Penn. *Plum* in bloom, 18th, Ill.; 11th and 13th, Iowa; 3rd and 13th, Mass.; 19th, N. Y.; 18th, Penn.; 15th and 18th, Vt.; 12th, Wis. Ripe, 22nd, Miss. *Quince* in bloom, 26th, Mass.; 9th, N. J.; 18th, Ohio; 19th, Penn. *Blackberries* in bloom, 20th, N. J. Ripe, 10th, Texas. *Almond* in bloom, 2nd, Neb. *Strawberries* in bloom, 1st, N. J.

BIRDS.—The first arrival and their migrations are reported as follows: *Blackbirds*, 3d, Kans. *Blue-jays*, 5th, Kans. *Bobolinks*, 18th, Iowa; 15th, Me.; 13th and 15th, Mass.; 14th, N. Y. *Cuckoos*, 19th, N. J. *Ducks*, 30th, Dak.; 19th, Mass., NW., and 22d, NE. *Geese*, 3d, 4th, 5th and 6th, Neb., N.; 15th, Minn., N. *Kingbirds*, 7th, Neb.; 12th, Ohio. *Martins*, 2d, Wis. *Night Hawks*, 16th, Iowa. *Orioles*, 1st, Me.; 10th and 14th, Mass.; 12th, Neb.; 12th and 15th, N. Y.; 12th, Ohio; 14th, Vt.; 17th, N. J. *Robbins*, with young, 15th, N. Y. *Swallows*, 7th, Me.; 6th, Mass.; 9th, Neb.; 1st, 14th and 16th, N. Y.; 3d, Ohio; 8th, Utah; 6th and 7th, Vt.; 14th, Virg. *Yellowbirds*, 8th and 10th, Mass.; 17th, N. Y. *Whippoorwills*, 19th, Iowa; 14th, Mass.; 1st, Ohio.

INSECTS.—*Grasshoppers*, flying at Camp Sheridan, Neb., N., 28th, NE., 29th; 2nd, still hatching out at